

**I claim:**

1. A dual input DC-DC power converter integrating high/low voltage sources,  
said power converter providing an output voltage to a load end, said power  
converter comprising:  
5     an electric storage device for charging and discharging of electric energy;  
      a high voltage source device whose voltage level is higher than said output  
      voltage, a first switch being provided in said high voltage source device; and  
      a low voltage source device whose voltage level is lower than said output  
      voltage, a second switch being provided in said low voltage source device;  
10    whereby said low voltage source device and said high voltage source device  
      are connected in series to form a power supply device, which is connected in  
      series with said electric storage device, said power supply device forms a  
      switching circuit of an effective power switch in different operation modes  
      according to the on/off state of said two switches, when said power switch is  
15    on, said high voltage source device or/and said low voltage source device  
      will charge said electric storage device, when said power switch is off, said  
      electric storage device will release energy to said load end.
2. The dual input DC-DC power converter integrating high/low voltage  
sources as claimed in claim 1, wherein said high voltage source device  
20    comprises a high voltage level source, and said first switch is arranged at an  
      output end of said high voltage level source.
3. The dual input DC-DC power converter integrating high/low voltage  
sources as claimed in claim 1, wherein said low voltage source device  
comprises a low voltage level source, and said second switch is arranged at  
25    an output end of said low voltage level source.

4. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein said first switch is a transistor.
5. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein said second switch is a transistor.
- 5 6. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein said first switch is further connected with a diode, which provides a path for the current of said electric storage device when said first switch is off.
7. The dual input DC-DC power converter integrating high/low voltage  
10 sources as claimed in claim 1, wherein said second switch is further connected with a diode, which provides a path for the current of said electric storage device when said second switch is off.
8. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein said electric storage device  
15 comprises:  
an inductor connected in series with said power supply device; and  
a capacitor connected in shunt with said inductor.
9. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 8, wherein when said first switch is on and said second  
20 switch is off, said high voltage source device provides power to said load end and charges said inductor and said capacitor to form an energy charging stage in an equivalent circuit of a buck converter.
10. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 8, wherein when said first switch is off and said  
25 second switch is on, said low voltage source device charges said inductor

and said capacitor provides power to said load end to form an energy charging stage in an equivalent circuit of a buck-boost converter.

11. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 8, wherein when said first switch is off and said second switch is off, electric energy stored in said inductor is released to said load end to form an energy discharging stage in an equivalent circuit of a buck and buck-boost converter.

12. The dual input DC-DC power converter integrating high/voltage sources as claimed in claim 8, wherein when said first switch is on and said second switch is on, said high and low voltage source devices are connected in series to charge said inductor and said capacitor to provide power to said load end to form an energy charging stage in an equivalent circuit of a buck-boost converter.

13. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein said first and second switches have different switching frequencies.

14. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein said first and second switches have synchronous switching frequencies.

15. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 14, wherein the switching frequencies of said first and second switches are made synchronous by means of simultaneous on but consecutive off or consecutive on but simultaneous off.

16. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein when one of said high and low

voltage source devices fails, the other one can still provide power stably.

17. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein said high/low voltage source device will automatically provide the required current to said load end by controlling the magnitude of the current of said low/high voltage source device under a constant output power.

18. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein an accurate output voltage and current can be obtained by properly adjusting a current reference signal and adding in an appropriate voltage reference signal to accomplish distribution control of the input power and the balance of the input and output powers.

19. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein a passive lossless turn-off soft-switching cell is added in the circuit to reduce switching losses of said two switches.

20. The dual input DC-DC power converter integrating high/low voltage sources as claimed in claim 1, wherein a passive lossless turn-on soft-switching cell is added in the circuit to reduce switching losses of said two switches.